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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/813,352

03/30/2004

Kangguo Cheng

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08/17/2006

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EXAMINER

LANDAU, MATTHEW C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/813,352

Applicant(s)

CHENG ET AL.

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21 is/are allowed.
- 6) ☒ Claim(s) 1-7 and 10 is/are rejected.
- 7) ☒ Claim(s) 8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION*****Drawings***

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the at least one other type memory device (claim 2) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 5-7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (US PG Pub 2005/0190590, hereinafter Chen).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

Regarding claim 1, Figure 1 of Chen discloses a first-type memory device 20 comprising a first transistor 25 and a first underlying capacitor 29 that are in electrical contact to each other through a first buried strap 28, said first buried strap positioned on a first collar region 46; and a second-type memory device 30 comprising a second transistor 35 and a second underlying capacitor that are in electrical contact to each other through an offset buried strap 38, said offset buried strap is located at a depth that is different from the depth of the first buried strap 28, and is

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positioned on a second collar region (not labeled), wherein said second collar region including said offset buried strap has a length equal to a length of said first collar region including the first buried strap. Note that it can be considered that the at least part of collar 46 has “a length” equal to the length of the other collar region. In other words, the limitation “a length” can be considered part of the total length. Applicant has not specified that the total collar lengths are equal.

Regarding claim 2, Figure 5 of Chen discloses the device contains multiple cells, each containing the first and second memory devices shown in Figure 1. Therefore, Chen discloses at least one other type memory device (equivalent to either device 20 or 30), with the elements of claim 1. The further offset buried strap can be considered offset in the sense that is it horizontally offset from the other buried straps.

Regarding claim 5, Figure 1 of Chen discloses a support region (substrate).

Regarding claim 6, Figure 1 of Chen discloses the first-type memory device 20 is formed within a first trench and the second-type memory device is formed within a second trench.

Regarding claim 7, Chen discloses the first and second trenches have a depth between 5 and 8 microns (paragraph [0021]).

Regarding claim 10, Figure 1 of Chen discloses said first and second underlying capacitors have a vertical orientation.

Claim 1, 5, 6, and 10 are rejected under 35 U.S.C. 102(a) as being anticipated by Hsu et al. (US Pat. 6,570,207, hereinafter Hsu).

Regarding claim 1, Figures 10 and 11 of Hsu discloses a first type-memory device 10c, the first-type memory device comprising a first transistor 25C and a first underlying capacitor 26 that are in electrical contact to each other through a first buried strap 27, said first buried strap positioned on a first collar region 34; and a second-type memory device 10 comprising a second transistor and a second capacitor 17 that are in electrical contact to each other through an offset buried strap 13, said offset buried strap is located at a depth that is different from the depth of the first buried strap, and is positioned on a second collar region 18, wherein said second collar region including said offset buried strap 13 has a length equal to a length of said first collar region including said first buried strap. Note that it can be considered that the at least part of the first collar region 34 has “a length” equal to the length of the other collar region 18. In other words, the limitation “a length” can be considered part of the total length. Applicant has not specified that the total collar lengths are equal.

Regarding claim 5, Figure 11 of Hsu discloses a support region (substrate).

Regarding claim 6, Figure 11 of Hsu discloses the first-type memory device is formed within a first trench and the second-type memory device is formed within a second trench.

Regarding claim 10, Figures 10 and 11 of Hsu disclose said first and second underlying capacitors have a vertical orientation.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu.

Regarding claim 3, Hsu does not specifically disclose the offset between the first buried strap region and the second buried strap region is from about 0.4 microns to about 0.6 microns. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hsu by selecting a value within the claimed range, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Mandelman et al. (US Pat. 6,605,838, hereinafter Mandelman).

Regarding claim 4, Hsu does not disclose the first underlying capacitor comprises at least one first bottling region and said second underlying capacitor comprises at least one offset bottling region. Figure 1 of Mandelman discloses a first underlying capacitor 16 comprising a first-bottling region and a second underlying capacitor comprising an offset bottling region. In view of such teaching, it would have been obvious to the ordinary artisan at the time the

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invention was made to modify the invention of Hsu by including bottling regions for the capacitor for the purpose of increasing the surface area of the capacitor plates, thereby increasing the capacitance.

*Allowable Subject Matter*

Claim 21 is allowed.

Claims 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: the prior art of record, either singularly or in combination, does not disclose or suggest the combination of limitations including a bottom surface of said first collar region is vertically offset from a second bottom surface of said second collar region.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."



### ***Response to Arguments***

Applicant's arguments filed June 16, 2006 have been fully considered but they are not persuasive.

Applicant argues that Hsu does not disclose "said second collar region including at least said offset buried strap has a length equal to a length of said first collar region including at least said first buried strap". As explained in the above region, it can be considered that the at least part of the first collar region 34 has "a length" equal to the length of the other collar region 18. In other words, the limitation "a length" can be considered part of the total length. Applicant has not specified that the *total* lengths of the collars must be equal.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

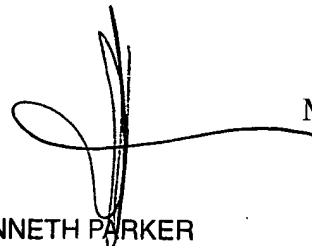
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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and (571) 273-8300 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should any questions arise regarding access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Matthew C. Landau

August 11, 2006

KENNETH PARKER  
SUPERVISORY PATENT EXAMINER